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ABSTRACT

"Exploring Careers" is a career education resource program, published in fifteen separate booklets, for junior high school-age students. It provides information about the world of work and offers its readers a way of learning about themselves and relating that information to career choices. The publications aim to build career awareness by means of occupational narratives, evaluative questions, activities, and career games grouped in fourteen occupational clusters. This fifteenth of the series presents an overview of jobs in agriculture, forestry, and fisheries occupations. Narrative accounts focus on a farmer, a cooperative extension service worker, and a forester, describing what they do and how they prepared for their jobs. Exploring sections relate skills needed for these occupations to students' personal characteristics, and learning activities such as planning a garden and cleaning up a stream are suggested. A Job Facts section lists nature and places of work, training and qualifications, and other information for eighteen occupations, grouped in the occupational clusters of agricultural production, agricultural support, forestry, and fishery occupations. ("Exploring Careers" is also available as a single volume of fifteen chapters.) (KC)

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Exploring Careers

Agriculture, Forestry, and Fishery Occupations

U.S. Department of Labor
Ray Marshall, Secretary

Bureau of Labor Statistics
Janet L. Norwood, Commissioner
1979

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Exploring Careers is available either as a single volume of 15 chapters or as separate chapters, as follows:

The World of Work and You
Industrial Production Occupations
Office Occupations
Service Occupations
Education Occupations
Sales Occupations
Construction Occupations
Transportation Occupations
Scientific and Technical Occupations
Mechanics and Repairers
Health Occupations
Social Scientists
Social Service Occupations
Performing Arts, Design, and Communications Occupations
Agriculture, Forestry, and Fishery Occupations

Photograph Credits

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Government Sources

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Preface

Exploring Careers is a career education resource for youngsters of junior high school age. It provides the kind of information about the world of work that young people need to prepare for a well-informed career choice. At the same time, it offers readers a way of learning more about themselves. The publication aims to build career awareness by means of occupational narratives, evaluative questions, activities, and career games presented in 14 occupational clusters. *Exploring Careers* emphasizes what people do on the job and how they feel about it and stresses the importance of "knowing yourself" when considering a career. It is designed for use in middle school/junior high classrooms, career resource centers, and youth programs run by community, religious, and business organizations.

This is 1 of 15 chapters. A list of all the chapter titles appears inside the front cover.

Exploring Careers was prepared in the Bureau's Division of Occupational Outlook under the supervision of Russell B. Flanders and Neal H. Rosenthal. Max L. Carey provided general direction. Anne Kahl supervised the planning and preparation of the publication. Members of the Division's staff who contributed sections were Lisa S. Dillich, David B. Herst, H. Philip Howard, Chester Curtis Levine, Thomas Nardone, Debra E. Rothstein, and Kathy Wilson. Gloria D. Blue, Brenda Marshall, and Beverly A. Williams assisted.

The Bureau gratefully acknowledges the cooperation of all the workers who agreed to be interviewed and photographed, the teachers and students who field tested a sample chapter, and all who shared their ideas with BLS. Many people in the counseling community offered encouragement and support. Special thanks for her generous assistance go to Cathy Cockrill, Career Education Curriculum Specialist, Fairfax County Public Schools, Fairfax, Virginia.

Although they are based on interviews with actual workers, the occupational narratives are largely fictitious.

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Contents

	Page
Agriculture, forestry, and fishery occupations	1
Farmer	14
Cooperative extension service worker	20
Forester	25
Job facts	31

Exploring Careers

Agriculture, Forestry, and Fishery Occupations

Soil research helps farmers grow better crops.

"Sue, would you drive me downtown today?" Larry Cohen asked his older sister. "I've got to do some shopping. Tryouts for the basketball team start tomorrow, and I need some new gym shoes."

Sue, who was taking a day off from her job as nutritionist in a local hospital, couldn't think of an excuse for not taking Larry. So they went downtown to buy Larry some shoes.

After they finished shopping, Sue and Larry decided to stop in a fast-food store and grab a bite to eat. Once they had gotten their food and sat down at a table, Sue noticed that Larry was staring into space with a worried look on his face.

"What's bothering you, Larry?" Sue asked. "Are you that worried about making the team?"

"I wish it was that simple," answered Larry. "I have to give a report tomorrow on the kinds of jobs in agriculture, and I don't know where to start."

Sue thought for a minute and then said, "How about starting with what's in your right hand?"

"Do you mean this fish sandwich?" Larry asked in an unbelieving tone.

"Sure," Sue replied. "Did you ever stop to think about how many different ingredients there are in that sandwich and where they all came from?"

"No, but it doesn't seem that complicated," Larry answered. "Let's see, the roll came from a bakery, the fish came from the ocean, and the sauce . . ."

"Very cute, Larry," snapped Sue. "I'm sure you'll make an A with such a comprehensive report. Now, do you want me to help you or not?"

"Sure I do," Larry answered contritely. "I just don't see what my fish sandwich has to do with agriculture."

"Take the bun, for example," responded Sue. "The wheat for the flour in it probably came from a grain farm in the Midwest. And quite possibly that particular variety of wheat was developed by an agricultural scientist. Can you think of any other ingredients in the roll?"

"I'm not sure," Larry replied. "Does the roll have milk or sugar in it?"

"Yes, dried milk and probably corn syrup also," replied Sue. "The milk may be from a dairy farm in Wisconsin, which is one of the big dairy States, and the corn syrup, from Iowa. Probably many more agricultural products are in the roll, but I'll leave them for you to investigate later. You might start by reading the ingredients listed on the wrapping of a loaf of bread. Now, to keep this conversation rolling, could you tell me where the fish in your sandwich came from?"

"I guess somebody caught it in the ocean," Larry replied, "but I'm not sure."

"You're probably right, Larry," answered Sue. "If the fish is a hake, haddock, or pollack, then it was probably caught by a fisher in the North Atlantic. But if it is catfish, it probably was raised on a fish farm."

"A fish farm?" asked Larry. "Now I think you're putting me on."

"No, aquaculture, or fish farming, is a rapidly growing area of agriculture that is still far from reaching its full potential," said Sue. "If you think I'm just telling you a fish story, then check it out in your school library."

"I think I will," said Larry. "That sounds like it might make a good topic for my report."

"Good," said Sue with a smile. "Now, can you tell me where that napkin you're wiping your face with came from?"

"Sure, that's easy," answered Larry with a grin. "It came from a napkin farm."

"Believe it or not, you're almost right," said Sue. "Most paper products come from pulp made from trees. And many trees come from tree farms. Now can you see what your fish sandwich has to do with agriculture?"

"Yes," said Larry, "the sandwich and everything in it are products of agriculture and the many different types of agricultural workers. I just didn't realize that a fish sandwich could be so complex."

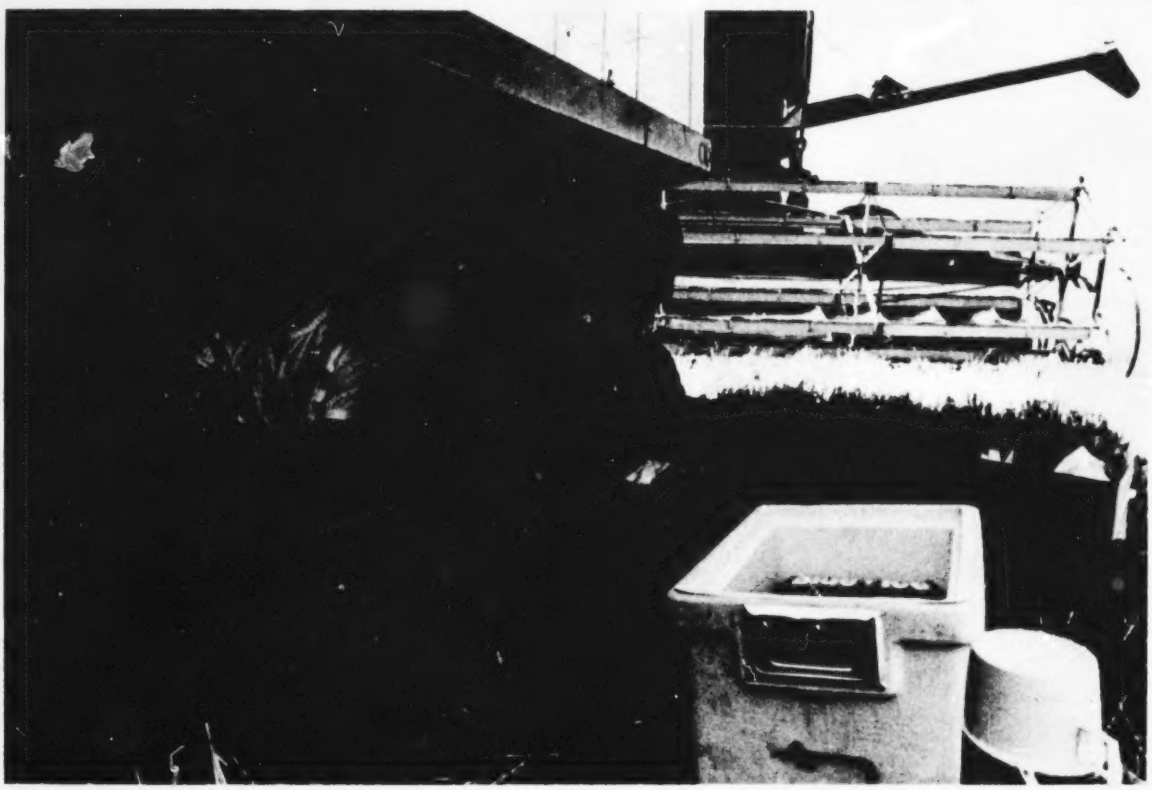
"Good thinking, Larry," said Sue, "but remember that we've just scratched the surface of the wide variety and complexity found in modern agriculture. I think, however, that you've made a good start now on thinking about your report."

Workers in agriculture, forestry, and fishery produce many of the products we use every day. The following sections will tell you about their jobs.

Agricultural Production Occupations

First, of course, there are the workers who are engaged directly in agricultural production. This broad group includes producers of plant products, such as corn, wheat, and vegetables, and producers of animals, such as chickens, cattle, and sheep. Most *farmers* and *ranchers,* however, now specialize in particular varieties of crops and animals. As a result, specialized types of workers are now needed for these various types of farm products. Many of these specialized workers are discussed in the following sections on occupations in *plant farming* and *animal farming.*

Accompanying this trend toward crop specialization is a trend toward larger sized farms—farms that are often too big for one person, or even one family, to take care of alone. Because of this, there are many opportunities for *farm laborers* and *farm labor supervisors* to help run the farms. These occupations also provide opportunities



Harvesting wheat can be hot work. A patch of shade and some lunch provide a welcome break.

for workers who want to farm but who don't yet have enough money to buy the necessary land and equipment.

Many large corporations, and some wealthy individuals also, are engaged in what is now called agribusiness. A corporation, for example, may hold large amounts of land on which grain is grown to be fed to cattle kept in pens or feedlots also owned by the corporation. Farm operations of this size are very complex and create jobs for *farm managers.*

Let's take a closer look at the types of workers needed in agriculture.

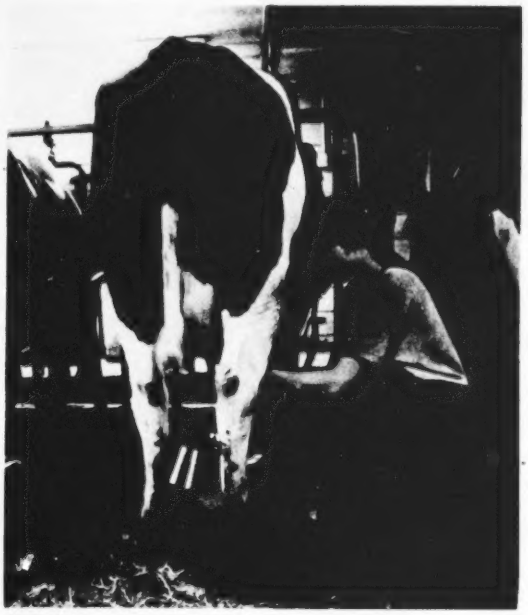
Plant Farming Occupations. Most farmers and farm workers are employed in plant farming.

The grain farming occupations include *cash grain farmers,* who are responsible for raising the various grains we use for food. Often these farmers' job titles refer to the specific type of grain they grow, such as *corn grower, rice farmer, soybean grower,* and *wheat grower.* Cash grain farmers cannot handle all the different jobs associated with raising large quantities of grain by themselves. *Grain farm workers* operate the farm machinery used in planting and harvesting grain and perform other duties, such as checking irrigation ditches and carrying supplies. *Farm labor supervisors* direct the activities of farm workers. *Detasseling crew supervisors,* for example, direct the activities of workers who break and pull tassels from corn plants on hybrid seed-corn farms.

Other workers grow and harvest vegetable crops. *Vegetable farmers'* job titles often refer to the vegetable they specialize in growing, such as *onion farmer* or *lettuce grower.* Farmers who grow a variety of different vegetables are sometimes called *truck farmers. Vegetable farm workers* do much of the labor required in raising and harvesting vegetables. Some farm workers called *vegetable harvest workers* pick, bunch, and wash vegetables. Supervisors oversee the vegetable farm workers.

Fruit and nut farming also requires workers with specialized skills. Farmers in this field usually are named by the type of crop they grow, such as *apple grower,*

Exploring Careers



Dairy cows have to be milked morning and night, 365 days a year.

Making maple syrup is a way of life for this farm family in Vermont.

Texas cantaloupes are shipped throughout the world.

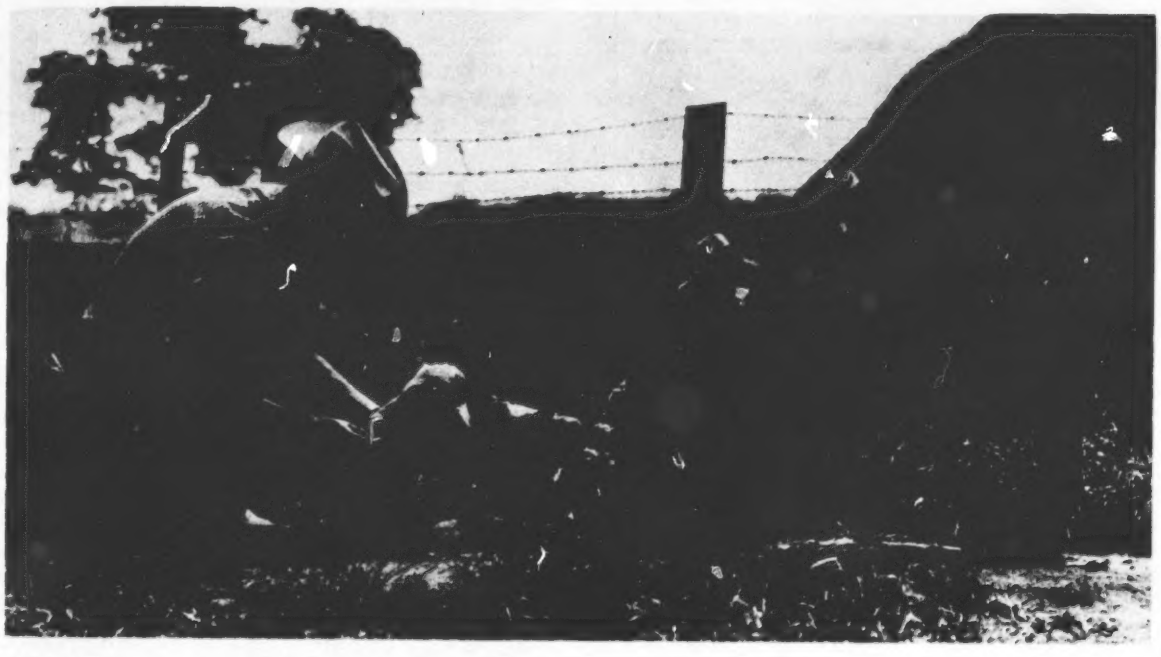
cherry grower, orange grower, pecan grower, grape grower, blueberry grower, and *strawberry grower.* In addition to laborers and supervisors, this kind of plant raising requires some highly specialized workers. *Fig caprifiers,* for example, attach figs containing wasps to fig trees in order to help ensure pollination. *Vine pruners* cut back berry vines so they will produce more fruit.

Field crops, such as cotton, peanuts, potatoes, sugar beets, sugarcane, and tobacco, also require specialized workers. *Seed-potato arrangers and cutters,* for example, are needed to attend the machines that cut potatoes into sections for use as seed. *Field crop supervisors,* farmers, and other types of farm laborers are also needed. *Shed worker supervisors,* another type of specialized worker, direct the activities of the workers who cure tobacco leaves in sheds on farms.

Animal Farming Occupations. The largest group of occupations in animal farming are the domestic animal farming occupations. Among these are livestock ranchers, such as *cattle ranchers, dairy farmers,* and *sheep farmers,* who breed and raise livestock for sale. *Livestock farm workers,* or *ranch hands* as they are more commonly called, assist ranchers by performing a wide variety of chores around the ranch, such as feeding and vaccinating animals and repairing fences. Many types of animal farming require specialized workers. *Top screws,* or *ramrods,* for example, supervise and coordinate the activities of *cowpunchers* in cattle ranching. *Lambers* assist ewes during lambing, while *sheep-shearers* clip the wool from live sheep in sheep ranching. *Fur farmers* breed and raise animals such as mink, fox, or chinchilla, and are assisted by *pelters* who skin the animals for their fur.

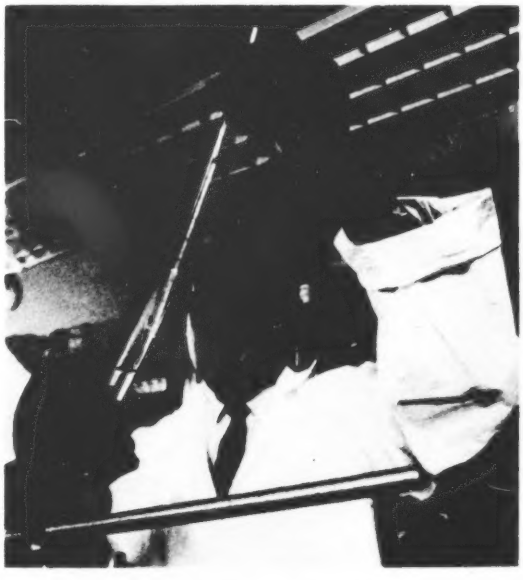
Poultry farming also requires many different types of workers. *Poultry farmers,* for example, raise improved strains of poultry developed by *poultry breeders* to produce eggs and meat. Many other specialized workers assist in poultry farming. *Poultry tenders* care for poultry used in experimental tests to develop better feeding systems. *Poultry farm workers* do many of the day-to-day jobs involved in poultry raising. *Poultry vaccinators* vaccinate poultry against diseases such as pox and bronchitis. *Chicken graders* grade baby chicks according to appearance and separate healthy from deformed or diseased chicks. *Chicken sexers* determine the sex of young chickens and separate them by sex.

Game animals, such as deer, pheasant, and quail, also are raised under controlled conditions. *Game farm supervisors* oversee and plan the activities of workers involved in breeding, raising, and protecting game on private or State game farms. *Game farm helpers* do most of the physical work associated with game farming. And *game-*



Assisting with the birth of a calf is part of a rancher's job.

Modern poultry farms have automatic feeding and watering systems.



Science has made significant contributions to modern agriculture.

bird farmers raise birds such as pheasant, quail, or partridge for sale to gun clubs, game preserves, or poultry houses.

Mammals and birds are not the only types of animals raised commercially. *Beekeepers* raise bees to produce honey and pollinate crops. *Reptile farmers* breed and raise reptiles such as rattlesnakes for their meat, venom, and skins. *Worm growers* assisted by *worm farm laborers* breed and raise earthworms for sale as fishing bait, garden soil conditioners, and food for exotic fish and animals.

Agricultural Support Occupations

Modern agriculture is a complex undertaking that requires many thousands of workers who are not directly involved in agricultural production. These workers are needed to help support agriculture in a number of areas, such as agricultural business, education, food processing, and science. Now let's take a quick look at some of these occupations.

Most types of farming, for example, require the use of large amounts of machinery, equipment, and other farm supplies, such as chemicals and pesticides. As a result, there are many jobs for workers who sell, maintain, and explain how to use machinery and supplies. *Farm equipment sales workers* are needed to sell the tractors, combines, plows, planters, and other farm equipment used in agriculture. These workers also help farmers choose the equipment that best suits their particular farming needs. *Farm equipment mechanics* maintain and repair tractors and a wide variety of other farm equipment.

Agricultural engineers help improve efficiency in agriculture by designing new types of farm equipment or improving existing model lines. *Agricultural chemical sales workers* sell and explain the use of the different types of pesticides, herbicides, and fertilizers that have greatly increased agricultural production in this country. *Agricultural pilots* spray chemicals on crops from airplanes and helicopters.

Workers in agricultural production also need considerable assistance with the financial and technical aspects of farming. *Bankers* in rural areas, for example, help support agriculture by providing loans for farmers to buy land, equipment, and other supplies needed in raising crops. *Agricultural economists* deal with problems related to production, financing, pricing, and marketing of farm products. *Agricultural cooperative extension service workers* provide information on agricultural research to farmers and encourage its use to increase the amount of agricultural products that farms can produce. *Veterinarians* provide valuable technical assistance to livestock

producers by keeping animals healthy and productive. Farmers also, of course, need markets for their farm products once they are harvested. *Buyers and shippers* help fill this role. Keeping accurate financial records is also an important part of agriculture. *Agricultural accountants* prepare and analyze financial reports for farm managers. *Agricultural commodity graders,* such as grain inspectors, also help support agriculture by assuring that farm products are of uniform quality and fit for consumption.

Science has made significant contributions to modern farming and is expected to produce even greater benefits in the years ahead. As a result, there are many jobs for scientists and other professionals who concentrate on agriculture. *Agronomists,* for example, conduct experiments and develop better methods of growing crops. *Plant pathologists* study the causes of plant diseases and develop ways to control weeds, insects, and plant diseases. *Plant physiologists* study the structure of plants and devise ways to improve their growth and storage life. *Geneticists* try to develop breeds of plants and animals that are better suited for the production of food and fiber. *Microbiologists* study bacteria and other tiny organisms to understand better their relation to human, plant, and animal health. *Animal physiologists* study the functions of the various parts of animals. *Animal scientists* develop improved methods of housing, sanitation, and parasite and disease control for livestock. *Animal nutritionists* specialize in finding feed requirements that will maximize production and in developing new livestock and poultry feeds. *Entomologists* study insects to try to find ways to control harmful insects and manage beneficial ones. *Seed analysts* conduct tests on samples of seeds to determine their rate of germination, purity, and weed content. *Agricultural chemists* develop chemical compounds for controlling insects, weeds, fungi, and rodents. They also perform experiments to determine how to use fertilizers properly and investigate problems of nitrogen fixation in soils. *Food scientists* develop new foods, food preservatives, and similar products. *Soil scientists* and *soil conservationists* study ways to improve the use of soils upon which agriculture is based.

Becoming a farmer can be very expensive. This tractor, for example, costs over $50,000.

Scientists and technicians help assure a plentiful supply of clean water for fish and wildlife.

Forestry Occupations

Forests are a vital natural resource that can be used repeatedly if they are properly managed. They provide habitats for conserving our wildlife as well as recreational facilities for ourselves. Forests also provide the raw materials for lumber and paper. Workers in the forestry occupations are concerned with the management and proper utilization of our forests.

Foresters, who often specialize in one area of work, such as timber management or outdoor recreation, are key workers in this field. Foresters plan and supervise the cutting and planting of trees and also protect the trees from fire, harmful insects, and disease. They may be responsible for other duties ranging from wildlife protection and watershed management to the development and supervision of camps, parks, and grazing lands. *Forestry technicians* assist foresters in many of their tasks, such as mapmaking, selecting and marking timber to be harvested, and planting seedlings.

Fires are one of the major dangers facing our forest resources. Thus *fire lookouts* and *fire rangers* are stationed in remote areas to spot and then put out or report forest fires. If a fire is reported in an inaccessible area, then *smoke jumpers*, under the direction of *smoke jumper*

A skilled logger can drop a tree exactly where he wants it.

Some college students work during summer vacation as fire fighters for the U.S. Forest Service.

supervisors, parachute into the area and put out the fire. *Forest-fire fighters,* sometimes called *smoke eaters,* also help control forest fires.

Harvesting forest products, or logging, is an important part of managing our forest resources. Before a stand of timber is cut, foresters, with the assistance of *forestry aides* and *timber cruisers,* decide what trees should be harvested and estimate the amount of wood in these trees. *Heavy equipment operators* then build access roads and trails to the cutting and loading areas.

Fallers, working singly or in pairs, then cut down the large trees marked by the forester. Expert fallers can usually drop a tree in the exact spot where they want it, without injuring nearby trees. Once the tree is down, *buckers* saw the limbs off and saw the trunk into logs. Sometimes small trees are felled with tree harvesters, machines mounted on a tractor and operated by *logging-tractor operators.*

Next, the logs must be removed from the cutting area. One method is called skidding. In this method, a choker (steel cable) is noosed around the log by *choker setters* and then attached to a tractor which drags or skids the log to the landing. A *rigging slinger* supervises and assists choker setters and tractor drivers.

After the logs reach the landing, they are loaded on a truck trailer and hauled to the mill. A *loader engineer* operates a machine that picks up logs and places them on the trailer. A *second loader* directs the positioning of logs on the trailer.

Forest nursery supervisors oversee and coordinate the activities of workers who raise tree seedlings for reforestation. Some of these workers are *seedling sorters,* who sort seedlings according to size and quality, and *seedling pullers,* who harvest tree seedlings in forest nurseries.

Millions of hardy seedlings are grown on tree farm nurseries. They get a good start at the nursery, then are transplanted.

Exploring Careers

Fishery Occupations

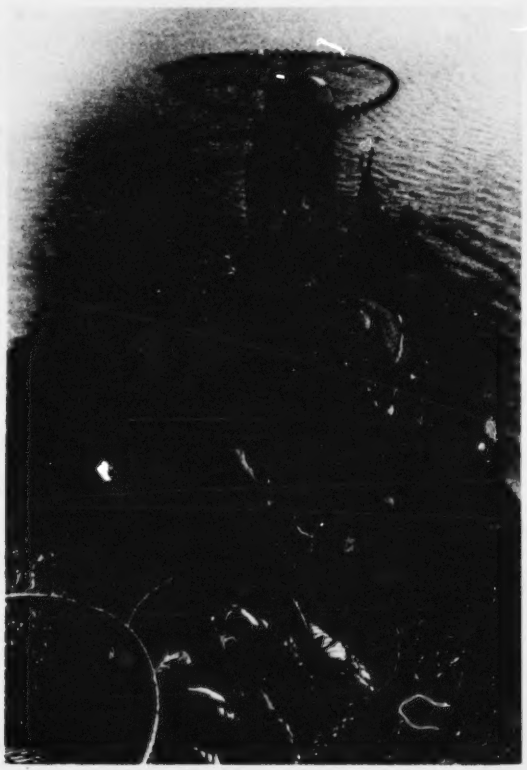
Fish provide an important source of protein for both humans and animals around the world. There are two major ways of obtaining fish. The oldest is simply to harvest the fish that are found in our oceans, rivers, and lakes. In recent years, however, another method, called aquaculture, or fish farming, has been growing in importance. Let's take a look at some of the workers in these two broad areas of fishery.

Fishers harvest aquatic animal life from our oceans, rivers, and lakes in a number of ways, depending on the location and the type of fish being sought. *Net fishers*, for example, catch finfish, shellfish, and other marine life using seines, trawl nets, gill nets, and a wide variety of other types of nets. These workers are often named according to the type of net they use, such as *dip net fisher, beach seine fisher,* or *purse seine fisher. Pot fishers* use pots (cages with funnel-shaped openings) to harvest marine life including crabs, eels, or lobsters. These fishers

These workers are checking salmon to see if they are ready to lay their eggs.

Fishing is one of the oldest ways of getting food.

Some oysters are raised for pearls.



Fish farming, or aquaculture, is a rapidly growing area of agriculture. These workers are harvesting catfish.

also may use dredges (rake scoops with bag attached) during certain times of the year. Pot fishers are usually named according to the type of marine life they fish for, such as *crab fishers, eel fishers,* or *lobster fishers. Line fishers* catch fish using hooks and lines. *Hand line fishers* simply use a line they hold in their hand, while *trawl line fishers* may use long lines that extend for over a mile with thousands of hooks hung at intervals on the line. *Diving fishers* gather marine life such as sponges, abalones, and pearl oysters from the sea bottom. *Fishing vessel deckhands* do a wide variety of jobs that assist fishers aboard ship. *Net repairers* assemble and repair nets on shore and aboard ship.

Aquaculture, or fish farming, is a rapidly growing field that offers many employment opportunities. *Fish farmers,* such as *trout farmers* or *catfish farmers,* spawn and raise fish for sale to supermarkets and other commercial interests. *Fish hatchery workers,* under the direction of *fish hatchery supervisors,* trap and spawn fish, incubate fish eggs, and rear young fish in hatcheries. Some of these fish, such as trout, are then stocked in streams to be caught by sport fishers, while others are used for commercial purposes. Shellfish, such as oysters, clams, and scallops, can also be raised commercially. *Shellfish-bed workers,* under the direction of *shellfish farming suprvisors,* plant, cultivate, and harvest these various types of shellfish. These workers are usually named according to the types of shellfish they work with and the type of duties they perform, such as *clam-bed worker, oyster unloader, scallop dredger, oyster picker,* or *clam digger. Aquatic life laborers* perform a number of routine tasks involved in raising marine life. *Shrimp pond laborers* may, for example, patrol shrimp ponds looking for predators. They also may help in feeding and harvesting fish or in preparing shellfish beds.

Fishery also offers numerous opportunities for professional workers. *Fishery biologists,* for example, collect and analyze data on the physiology of fish, transplanting methods, fish raising techniques, and management of fish and shellfish stocks.

Personal Characteristics

The basis for the work done by people in each of these fields lies in nature. Agriculture, forestry, and fishery would not be possible were it not for the sun and the clouds, the soil and the seas, rivers and lakes, and forests and fields. It is not surprising, therefore, that successful workers in these fields have been actively interested since childhood in hunting and fishing or in observing birds, insects, wildlife, trees, and flowers. They have a strong *interest in nature* and the environment around them.

Not surprisingly, people in many of these occupations *enjoy working outdoors.* Working outdoors, however, can often be physically demanding; these workers are exposed to all types of weather conditions and often must lift heavy objects or perform hard physical labor for extended periods. Forestry workers, for example, may have to hike many miles to reach fires or when "cruising" timber stands. As a result, *physical strength* and *stamina* are assets.

Agriculture, forestry, and fishery have become highly mechanized and machines do much of the work that used to be done by hand: Planting and harvesting crops, hauling in fishing nets, and harvesting trees. But these machines must be maintained and repaired. A belt may snap on a farmer's combine during the critical harvest time, for example. Or a winch used for hauling in nets may break down while a fisher is far out at sea. If the farmer and fisher can't fix these problems by themselves, they may experience costly delays. Because of this, *mechanical ability* and the *ability to work with your hands* are extremely important.

Carrying 50-pound sacks of feed is hard work.

Work schedules in agriculture often are set by elements beyond human control. A farmer, for example, may have only a few days when conditions are just right for planting or harvesting crops. If the farmer is not fully prepared when this time arrives, there will simply be no crop and thus no farm income that growing season. Consequently, being *well organized* is essential.

Agriculture, forestry, and fishery workers often must choose the best way to spend their time and money from among a wide variety of options. A forester, for example, may be given a limited budget for managing a section of woodland and must decide how best to use the money. Should part of the money be spent on firefighting equipment or on fertilizer, for example? Workers in these fields must be *able to set priorities.*

Many people in agriculture, forestry, and fishery are their own bosses or work with little or no supervision. This takes *initiative* or the *ability to be a self-starter.*

Crops, animals, trees, and other agricultural products do not grow overnight. Some years you may see little or no income or other visible results for your work. Because of this, *patience* and the ability to withstand bad years and save during good years are important qualities.

Much of the work in agriculture, forestry, and fishery is based on the ability to apply science on the job. Do you have a strong *interest in science?* Are you curious about life and living things? Are you a good observer? Do you examine things critically and analyze what you have seen? These traits are essential for such workers as fishery biologists, plant breeders, poultry scientists, and botanists who must understand science and use it in their work.

Many agriculture, forestry, and fishery occupations involve *working with people.* Frequent, if not daily, exchanges with other people are an important part of the job for cooperative extension service workers, feed sales workers, and farm credit managers, among others.

Finally, a *sense of responsibility* is very important for workers in agriculture, forestry, and fishery. You should care not only for this season's crops or animals, but also for the long-range protection and improvement of the environment. If you don't, then surely you are not meeting your responsibilities toward future generations.

Training

Training requirements vary widely. Farm laborers, fishers, and smoke jumpers, on the one hand, may find

jobs without finishing high school; they learn on the job. On the other hand, cooperative extension service workers, fish biologists, and many others need college degrees in agriculture or a science. The training requirements for 18 selected occupations are listed in the Job Facts section at the end of this chapter.

Since there is a wide variety of training paths for such a broad field as the agriculture, forestry, and fishery occupations, no one path is the best for all of them. There are, however, some things you can do now to explore your interest.

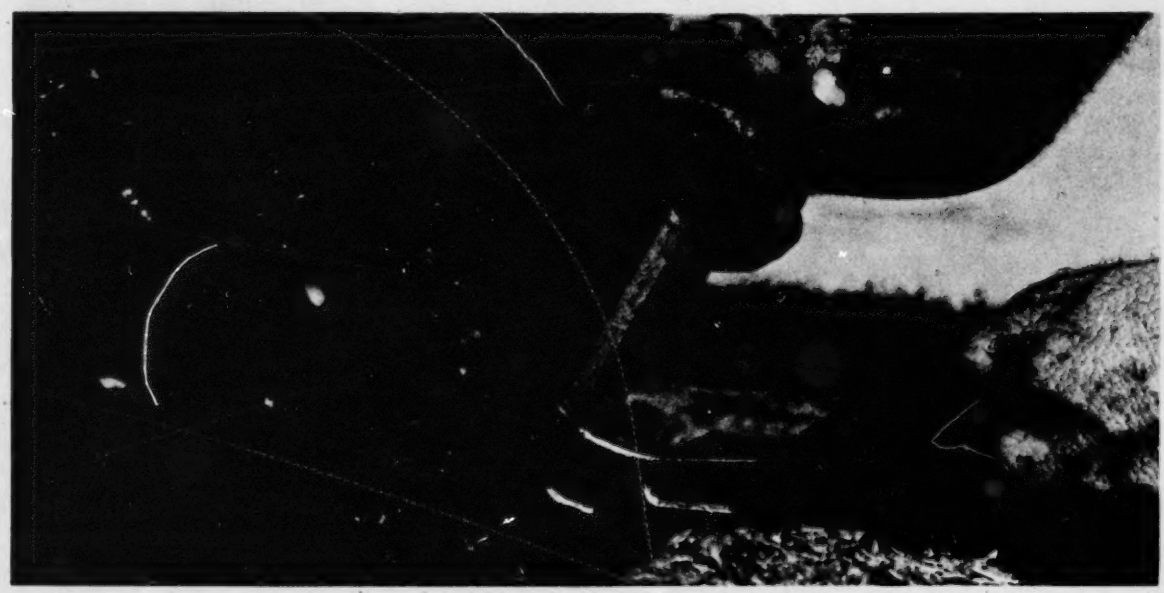
Science is very important in many of these occupations. High school courses in biology, chemistry, physics, and mathematics provide the foundation you'll need for the science courses you'll take later on. Science fairs give you the opportunity to do projects in agriculture, forestry, and fishery. High school courses in vocational agriculture, although not essential, are useful for testing your interests and seeing if you have the skills needed by workers in agricultural production.

As a general rule, growing up on a farm or having some agriculture background or experience is helpful. One reason for this is that the day-to-day tasks involved in many of these occupations are best learned through experience. In addition, working at a job is one of the best ways to find out if you like the work and are able to meet the demands of the job. Even if you do not live on a farm, you can gain useful experience by working part time or summers on a farm or for a summer camp.

You also might participate in farming programs for young people, such as the Future Farmers of America or the 4-H Clubs. These organizations are important sources of training for young farmers and provide practical experience in agriculture along with awards and other forms of recognition. Members also are active in fairs, agricultural contests, horse shows, and a wide variety of other activities.

Farm experience, however, is not essential for many of the scientific, technical, and business careers in agriculture, forestry, and fishery. In fact, many of the students enrolled in State schools of agriculture are from urban areas. Even if you live in a city, however, you should learn as much about the environment and the natural world as you possibly can. Taking nature walks and observing wildlife, trees, and flowers as well as hunting and fishing are activities you might consider.

The Boy Scouts, Girl Scouts, Campfire Girls, and similar organizations offer good opportunities for getting outdoors and learning about your environment. Youth organizations offer numerous programs and proficiency badges that are directly related to the fields of agriculture, forestry, and fishery.



Farmers need to know how to repair machinery.

Farmer

John O'Quinn samples the crop. "The harvest is the best part of farming," he explains, "because it's everything you've been working for."

The sun had not yet risen over the Eastern Shore of Maryland when John O'Quinn climbed into his pickup truck to drive to his farm for another day's work. Getting up before dawn was nothing new to John, though; he had worked on the farm since he was a very young boy. Even while he was studying agriculture at the University of Maryland, he had come home almost every weekend to help his father run the family's 500-acre farming operation. Then, about 2 years ago, his father had retired, and John, along with his sister Alice, had taken over the operation of the farm.

As he was driving to the farm, John felt a sense of excitement because today was a very special day, the beginning of the watermelon harvest. Work had begun on preparing about 100 acres of land for watermelons back in September with the planting of a rye cover crop to strengthen the soil and also to prevent soil erosion from occurring over the course of the winter. As soon as winter had passed, John plowed up the rye cover crop and began preparing a seedbed for the melons. Then, around the middle of April, after most of the danger of frost had passed and after a good rain, John had planted the watermelon seeds. During the planting process, he also had worked hundreds of tons of fertilizer into the soil. The seeds had sprouted quickly, and it looked as though there would be a good crop if only it would rain a little.

But the rains had stayed away. Every day for over a month John had checked the weather reports and scanned the sky for clouds. As the plants began to wither and die, John regretted the fact that he hadn't installed the expensive irrigation system he had considered buying the year before. Then, in late June when the crop seemed almost lost, the rains came and the field sprang to life.

Now it was August, and John would soon be checking on how the first day of the harvest was progressing. But first he had to feed a few hungry animals.

Upon arriving at the farm, John stopped by the barn where Pete Ward was waiting. Pete was a farmhand who had worked with John's family for over 20 years.

Pete was standing beside some large sacks of grain that he had brought out of the barn. Together he and John loaded the grain into the back of the pickup and drove to a nearby pen where John kept about 100 hogs. As the truck stopped by the pen, the pigs ran toward it squealing and grunting in obvious expectation of a good meal.

Pete began mixing the feed grains while John climbed into the pen to check the pigs. As soon as he entered the pen, John was surrounded by a crush of squealing pigs. He scratched the backs of a few, which the pigs loved. While he was doing that, John was checking for signs of disease or other problems. In addition, and to the pigs' misfortune, John was estimating the time required before they would be ready for market, which he determined to be about 2 more weeks.

After John and Pete finished feeding the pigs, they drove back to the barn, where they picked up a couple of salt licks, 50 gallons of molasses, and about 10 bales of hay. They then drove to a nearby field where John was grazing about 75 head of cattle. As John and Pete approached the field, the cattle began moving towards the gate, just as the pigs had done earlier. John drove the pickup slowly into the field, while Pete pulled bales of hay off the back of the truck and kicked them open for the cattle. When they finished putting out the hay, John and Pete drove across the field to some large boxes that had about a quarter of a wheel showing above each of their tops. These were molasses feeders that John used to help the cattle put on weight more quickly. When the cattle licked the wheel on top, the wheel turned, bringing up molasses from the bottom of the box. John and Pete quickly checked the molasses level in the boxes and filled up those that needed it. John was a little disappointed by the fact that the cattle didn't seem to be eating much of the molasses, but he knew that this wouldn't keep him from trying more experiments in the future. If he didn't keep improving his farm's efficiency, John knew he would not be able to compete with other farmers and would have to go out of business.

By now the sun was getting fairly high in the sky and the temperature was approaching 90 degrees, but John and Pete still had a lot to do. First, John wanted to see how the watermelon harvest was progressing. Then, if all was going well there, he and Pete would drive to another field and begin preparing the land for next year's crop.

When he arrived at the watermelon field, John felt elated, as he always did at harvest time, because for John, as for all farmers, harvesting crops or sending livestock to market provides tremendous rewards. These rewards come not only from the money gained, which sometimes isn't much, but also from a sense of pride and satisfaction at seeing the results of many months of long, hard work.

Alice, John's sister, was overseeing the harvest, so John drove over to her as soon as he got to the field. Alice was standing near a machine like a conveyor belt that was feeding melons into the backs of three large trucks. The machine also automatically separated the melons according to size. Thus small melons were going into one truck, average size melons into a truck from a large supermarket chain, and large melons into a truck from a processing plant.

"How are things going?" asked John as he got out of his pickup. "Are there any problems?"

"Nothing major," answered Alice, "but I sure could use another skilled cutter or two. We've already had one truck come back because there were too many green melons in it." Cutters are usually the most experienced and skilled field laborers in harvesting watermelons. They usually go down the rows in front of the other laborers and determine, almost by instinct, which melons are ripe. They then cut the ripe melons from the vines and stand them on end to be loaded on wagons by other laborers following behind. If the cutter selects too many unripe melons, the truck will be sent back by the agricultural broker who acts as a middleman between the farmer and the crop's buyers.

John groaned in response to Alice's request for more cutters, because he knew what she was asking. Everyone in the area was harvesting melons right now, and there wasn't an extra laborer to be found anywhere, especially a skilled cutter.

"It looks like you and I have just been drafted as cutters, Pete," said John with a grin as he looked at Pete who was pretending to hide behind the pickup.

John went home very tired that night and awoke early the next morning with very sore muscles from the constant lifting and stooping required in cutting watermelons. Nevertheless, he felt the sense of satisfaction and accomplishment that only a hard day of physical labor can bring.

There was, however, one thing that bothered him. He hadn't been able to prepare the grain field for planting as he and Pete had planned, and there were still a lot of watermelons to be harvested. John couldn't help smiling, though, when he thought of the conversation he and Pete would have while feeding the stock that morning about who would get to sit on a tractor all day and who would have to work another day as a cutter.

John hires vacationing students for the melon harvest. Following the cutters through the fields, they pick up the ripe melons and load them on wagons.

Exploring

Farmers spend much of their time outdoors in all kinds of weather.

- Do you enjoy working outdoors, or would you prefer to work in a controlled environment such as an office building?
- Do you like outdoor activities such as swimming, hiking, fishing, camping, and hunting?
- Do you mind working in the garden or mowing your family's lawn?
- Do extremes of heat or cold bother you?

Because they are their own bosses, farmers must have initiative and be self-starters.

- Do you get up in the morning by yourself?
- Do you do your homework and household chores without being prodded by your parents?
- Do you stick with projects until they are finished?
- Do you take responsibility for your family's pets?
- Do you get to class on time every day?

As farming methods grow more complex, farmers must take on more planning and managerial duties.

- Do you always finish your homework on time?
- Do you keep a diary?
- Do you use a calendar to organize your time?
- Do you make lists of things to do?
- Are you good at long-range projects, such as gardening, that require a good deal of organization?
- When you are in control of a project, can you get people to work without resenting you?

John sells some of his crop at the local auction. "It gives me a chance to socialize with other farmers while I do business."

Farmers must respect the environment.

- Do you throw trash in the trash can?
- Does it bother you when you see a polluted river?
- Do you save cans for recycling?

Farmers must work with machinery and often maintain and repair their own equipment.

- Do you like to build things?
- Do you like to work with your hands?
- Do you repair your own bicycle?
- Do you like to learn how machines work?
- Are you handy with tools?
- Before you start working on something, do you think about how you will go about it?

Suggested Activities

Listen to the farm reports on your local radio or television station. Look up any terms whose meaning you don't know.

Your newspaper's financial section lists the day's prices for a variety of farm products. Follow the price of a particular product, such as wheat or corn, over a period of time. Can you see how fluctuations in crop prices would affect you as a farmer?

Write a report on one or more of the following things that farmers must deal with: Plant varieties, plant diseases, cattle varieties, animal diseases, insects, chemicals, fertilizers, and soil types.

Go to a livestock auction if there is one in your area. Make a list of the grades and types of animals sold at the auction and the prices they sell for.

Visit the meat counter of your local grocery store or supermarket. Note the various cuts and grades of beef that are sold. Can you see any difference in the various grades of meat?

Visit a farm equipment dealer if there is one in your area. Find out why there is such a wide range in tractor sizes and horsepower. Look at the various farm implements that are for sale and try to figure out how they work, and what they are used for.

Try to get permission to accompany a veterinarian who treats farm animals. Note the types of animals that are treated, what some of the most common ailments are, and how the veterinarian handles these ailments.

For more information on farming as a career, read *Careers in Agriculture and Natural Resources,* published in 1976 by the National Association of State Universities and Land Grant Colleges. Your library or State agricultural college may have this booklet.

Join a farming organization for young people such as the Future Farmers of America or the 4-H Club. Members of these organizations gain practical experience in agriculture and take part in fairs, agricultural contests, horse shows, and many other activities.

If you are a Boy Scout, try for merit badges in Agriculture, Animal Science, Beekeeping, Botany, Farm Arrangement, Farm Mechanics, Farm Records, Gardening, Plant Science, Rabbit Raising, Soil and Water Conservation, and Veterinary Science.

If you are a Girl Scout, see if your local troop has the From Dreams to Reality program of career exploration. Troops may also offer opportunities to try out careers through internships, service aide and community action projects, and proficiency badges in a number of areas including Animal Kingdom, Conservation, Food Raiser, Horsewoman, and Plant Kingdom.

Plan a small garden for your yard or any small plot of land you can get permission to use. Here are some things you might want to do before you plant anything.

- Obtain soil samples from the plot you have selected and take them to your county agent for testing. When the results come back, ask the agent to explain them to you and to recommend what to plant and what kind of fertilizer to use.
- Send for some garden seed catalogs. These will give you an idea of the wide number of crop varieties available and provide valuable information on planning your garden.

Try to obtain first-hand experience in farming by getting a part-time or summer job on a farm or ranch.

Join an Agriculture, Veterinary, or Conservation/Ecology Explorer Post if there is one in your area. Exploring is open to young men and women aged 14 through 20. To find out about Explorer posts in your area, call "Boy Scouts of America" listed in your phone book, and ask for the "Exploring Division."

Write the Dean of Agriculture of your State's land grant college or university. The Dean can provide you with

information on careers in agriculture, and the training they require.

See if you can solve the following math problems which are typical of some of the simpler calculations farmers must make in planning their activities:

1. Bill Jenkins, a Kansas farmer, plans to raise 600 acres of wheat this year. If Bill gets 40 bushels of wheat per acre, how many bushels will he raise?

2. Bill plans to spend about $100 per acre on growing the wheat.
   a. At what market price per bushel will Bill break even?
   b. What price per bushel does he need to get in order to make $24,000?

3. A farmer plans to put a four-strand barbed wire fence around a 640-acre plot of land (640 acres = 1 section = 1 square mile). Barbed wire costs $35 for a ¼-mile roll. How much will the wire for the fence cost?

4. A cattle feedlot operator has determined that her cattle gain 1 pound of weight for every 5 pounds of feed. The price of cattle is now 50¢ per pound. Grain costs $4.80 for a 60-pound bushel. What is the operator's profit or loss for each bushel fed?

See answers at end of chapter.

Related Occupations

Farmers aren't the only people involved in producing agricultural products. People in many other occupations work outdoors and assist in the production of crops and animals. Some of these jobs are described below. If you need to, refer to the list of job titles at the end.

1. Although I don't own a farm, I have the same planning and management responsibilities that a farmer has. Who am I?

2. I repair and maintain farm machinery and equipment. I work for a tractor dealer. Who am I?

3. I do much of the physical labor on the large farm on which I work. Who am I?

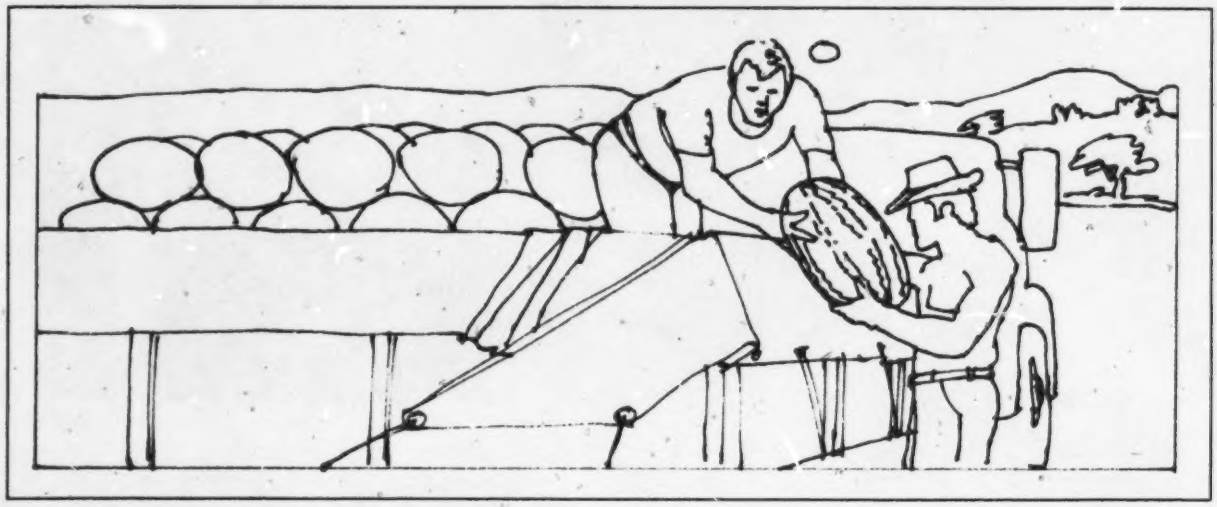
4. I apply fertilizers and insecticides to crops by flying over them with my plane. Who am I?

5. I act as an agent between farmers and the people who buy their crops. Who am I?

6. When farmers' animals get sick or need treatment, I am the one who usually diagnoses the problem and treats it. Who am I?

Agricultural pilot
Agricultural products broker
Farm equipment mechanic
Farm laborer
Farm manager
Veterinarian

See answers at end of chapter.



Cooperative Extension Service Worker

Bev Williams has a master's degree in dairy science. "I grew up on a farm," says Bev, "so it seemed natural to make agriculture my career."

It was a cold winter night on a dairy farm in northern Maryland. Jack and Anne Medgar, the owners, were relaxing before the fire after a hard day's work. Jack was reading a farm trade journal, *Modern Dairy Farmer.*

"Listen to this, Anne," he said with a laugh. "Dairy farmers in Ohio are feeding their cattle cement and getting increased milk production. Can you believe that crazy idea?"

"I'm not sure it's such a crazy idea, Jack," said his wife. "Agricultural science is continually coming up with new ideas. Some of the things you do now on the farm wouldn't have been possible 20 years ago. Why don't you call Bev Williams and see if she's heard of it? Who knows, using cement might increase milk production on this farm."

A few days later, Jack called Bev, the county extension service agent. He asked her about cement in cattle feed.

"I have read about it," Bev assured him, "but it is still in the experimental stage. In fact, the university is now testing it. The idea is to use cement dust as a dairy cattle feed supplement. Apparently the idea has been tried a few times and has resulted in higher milk production. But it hasn't been done under controlled conditions, and we're not sure if there is a connection between the cement and the milk production. Possibly the high calcium content of the cement dust is a factor. I'll try to keep abreast of the research, though, and see if it might work in your farming operation."

As she put down the phone, Bev made a mental note to call the scientist at the university who was in charge of that research project and find out how the experiment was going.

"I might even mention this in my monthly newsletter," she thought.

Bev doesn't get calls about feeding cement to cattle every day. But she has to be prepared for calls like Jack's. Keeping track of current agricultural research, making it known to farmers, and encouraging them to use the results of this research—that's what a county extension service agent's job is all about.

Farmers have to be convinced that new ways of doing things are worth trying. They won't listen to just anyone who comes along with advice. Bev and other extension agents need years of training to develop the expertise that will make listening to their advice worthwhile. Extension agents usually know a lot about agriculture from growing up on a farm—or at least having a farm background.

Bev grew up on a dairy farm right in the area. After high school, where she was active in 4-H, she attended the State agricultural university. There she earned a bachelor's degree and then went on to earn a master's degree in dairy science. After graduation, she worked for a farm supply company for about 5 years before getting the job she has now.

Now let's look at one of her workdays. There's no such thing as a "typical" day for Bev. There's so much variety in her job that every day is different. That's one of the things she likes best about the job.

Today, Bev will be spending most of the morning in her office. As soon as she gets there, Bev goes through her mail. She notices some soil test results from the university and sets them aside. She'll go over them later. When she examines the soil results, she'll decide on fertilizer and crop recommendations. Later on, she'll discuss these with the farmers who submitted samples of their soil.

As she continues to go through the pile of mail, she finds circulars from farm supply companies promoting new machines, seeds, feeds, and chemicals. She looks these over carefully since farmers often ask her opinion on new developments in farm supplies.

Bev then turns to the rest of her paperwork. She puts together her notes for the report she has to submit to the university four times a year. In this report, Bev will list the farmers she has been in touch with, describe the advice she has given them, and explain how her suggestions are working out.

Bev also works on her monthly newsletter for the farmers in the county. In the newsletter she discusses new research developments, such as the cement dust in cattle feed. She also reports on regulations and government policies affecting farmers and on agricultural prices and farm management.

Around 11 o'clock, Bev leaves her office and drives to the local radio station to tape her weekly farm report. She usually chooses a topic that will interest most farmers in the county. This week, for example, she discusses some of the methods for controlling Johnson Grass, a weed that infests many farms. After lunch, Bev drives to a dairy farm to go over a suggested feeding program for the farmer's herd. The farmer had noticed a decline in his herd's milk production and about 2 weeks ago asked Bev if she had any suggestions. Bev had told the farmer to bring some forage samples of his hay and silage into the extension office. She sent the samples to the State agricultural university for analysis. When the results came back, Bev studied them carefully, noting among other things the protein and water levels of the forage. Now, she and the farmer are working together on a feeding plan that would be economical but still ensure good milk production. After a few hours of work, they finally arrive at what they both think will be a good combination of roughage and grain for the farmer's herd.

Bev's next stop is at a farm whose owner has asked for help concerning a sensitive financial question. The

farmer is nearing retirement and would like to see his son take over the farm. The son has the knowledge and ambition to take over the farm, but he doesn't have the money to buy the farm. Bev and the farmer and his son sit down and discuss the situation from all angles. Finally, the farmer reaches a decision that would give him a retirement income and still enable the son to enter the farming business. He decides to sell the cows and machinery to his son and keep the land. The son would then rent the land from his father. While Bev does not make this decision for the farmer, she does help present him with a wide range of options from which to choose. Helping the farmer make a wise decision gives Bev a real feeling of satisfaction.

By now it is after dark, so Bev does not return to her office. But her workday is still not over. She drives home to have supper and get ready for a meeting she is to attend that night. The meeting is being conducted by a farmers' organization, and Bev wants to be there for two reasons. First, she will have the opportunity to speak with a number of farmers and thus keep informed of their latest concerns. Second, she knows the subject matter of the meeting will be of interest to a number of farmers who cannot attend. By attending, Bev can later answer any questions they have about the meeting. Perhaps one of her answers to a farmer's question will help the farmer run a more productive and profitable operation.

Exploring

Extension agents must be able to work with and gain the respect of other people.

- Do you listen to what your friends have to say?
- Do you enjoy participating in group activities?
- Are you a leader in these activities?
- Do you enjoy speaking in front of your class?
- Are you good at giving directions?
- Do you organize activities?
- Do people ever ask you for your opinion?

Extension agents advise farmers on methods chosen from a wide variety of alternatives.

- Are you able to plan your time effectively?
- Can you set priorities?
- Do you like looking into all of the various aspects of a subject?
- Do you have trouble making decisions when given a wide range of choices?
- When buying clothes, do you buy the first ones you see, or do you shop around for something better?

Extension agents must be able to express themselves well both orally and in writing.

- Do you keep a diary?
- Do you write many letters?
- Do you enjoy explaining things to people?
- Do you like writing themes in English class?

Even after they complete school, extension agents must keep abreast of new developments in agricultural science and farming methods.

- Do you enjoy reading on your own?
- When you see something that interests you, do you enjoy learning more about the subject?
- Do you enjoy school subjects such as science?
- Do you like reading about your hobbies?
- Are you interested in how things work?

When farmers seek help from extension agents, they depend on getting help quickly and efficiently.

- Can people depend on you?
- Do you do the things you promise to do?
- Do you get to class on time everyday?
- Do you ever volunteer to help around the house?

Suggested Activities

Plan a small garden for your yard or any small plot of land you can get permission to use. Here are some things you might want to do before you plant anything.

- Obtain soil samples from the plot you have selected and take them to your county agent for testing. When the results come back, ask the agent to explain them to you and recommend what to plant and what kind of fertilizer to use.
- Send for some garden seed catalogs. These will give you an idea of the wide number of crop varieties available and provide valuable information on planning your garden.

Try to obtain first-hand experience in farming by getting a part-time or summer job on a farm or ranch.

Bev discusses a feed problem with a dairy farmer. "If I can't solve a problem, it's my job to find someone who can."

Write articles for your school newspaper. If your school doesn't have a newsletter, start one. This will help develop your writing skills, which are essential in extension service work.

Spend time on hobbies and other activities in which you build, repair, or maintain things. Work on your bicycle. Do carpentry. Check the oil, water, and tires on your family's car. Make repairs around your home. Try an electronics project for your school's science fair. These activities will help you understand the problems that farmers face daily in repairing and maintaining the many buildings and the variety of equipment found on modern farms.

Invite your county extension agent to speak to your class about his or her job. Prepare questions in advance.

Help teach youngsters about the outdoors. You might lead nature walks and help them learn about the environment by identifying trees, plants, flowers, insects, birds, and other wildlife. This will help you develop teaching and leadership skills.

Join a farming organization for young people such as the Future Farmers of America or the 4-H Club. Members of these organizations gain practical experience in agriculture and take part in fairs, agricultural contests, horse shows, and many other activities.

Visit the agricultural exhibits at a county or State fair. Usually, there will be young people at the fair exhibiting their own animals. Speak with these young exhibitors and ask them about their animals, what is involved in caring for the animals, and how the exhibitors feel about a career in agriculture.

Do a report on the six major breeds of dairy cattle. To help remember what you learned, try to identify the breeds you see on farms whenever you are driving through rural areas.

See if you can get permission to visit a farm in your area. While you are there, ask the farmer or farm workers about the products they raise and the different tasks involved with raising these products.

If you are a Girl Scout, see if your local troop has the From Dreams to Reality program of career exploration. Troops may also offer opportunities to try out careers through internships, service aide and community action projects, and proficiency badges in a number of areas including Animal Kingdom, Plant Kingdom, Science, Conservation, Games Leader, and Reporter.

If you are a Boy Scout, try for merit badges in Agriculture, Animal Science, Beekeeping, Botany, Communications, Environmental Science, Farm Arrangement, Farm Mechanics, Farm Records, Gardening, Pigeon Raising, Plant Science, Public Speaking, Rabbit Raising, Soil and Water Conservation, and Veterinary Science.

Join an Agriculture, Conservation/Ecology, Education/Teaching, Veterinary, or Science Explorer Post if there is one in your area. Exploring is open to young men and women aged 14 through 20. To find out about Explorer Posts in your area, call "Boy Scouts of America" listed in your phone book, and ask for the "Exploring Division."

For more information on a career in agriculture, read *Careers in Agriculture and Natural Resources*, published in 1976 by the National Association of State Universities and Land Grant Colleges. Your State agricultural college can also provide information on crop and animal farming and extension programs in your State.

Write to the Science and Education Administration-Extension, U.S. Department of Agriculture, Washington, D.C. 20250, and ask for the pamphlet, *Your Career as an Extension Agent.*

Related Occupations

There are many other occupations concerned with improving the productivity of agriculture. Some of these are listed below, along with possible definitions of what the worker does. For each occupation, see if you can choose the correct definition.

1. Soil Conservationist

a. Provides technical assistance to farmers and others concerned with preventing damage to land or streams.
b. Makes plastic tarps to prevent soil from becoming bruised during hailstorms.
c. Evaluates timber stands to determine amount of wildlife they can support.

2. Veterinarian

a. Administers programs for soldiers leaving the Armed Forces.
b. Diagnoses, treats, and controls diseases and injuries among animals.
c. Provides counseling services to aging athletes.

3. Soil Scientist

a. Categorizes soils according to a national classification system.
b. Studies effectiveness of various detergents in removing soils.
c. Encourages the removal of vegetation to help prevent erosion.

4. Farm Manager

a. Directs the activities of all farmers in a State.
b. Manages the Federal Agricultural Resource Marketing (FARM) Program.
c. Plans and directs agricultural activities on large farms.

5. Animal Breeder

a. Artifically impregnates cows and ewes.
b. Develops improved breeds of animals that will be more productive.
c. Selects animals to be used to provide energy in breeder reactors.

See answers at end of chapter.

Forester

Paul Ivy manages over 60,000 acres of timberland. With this tool, he can find out how fast his trees are growing.

Paul Ivy works as a forester for a medium-sized forest products company based in the Middle Atlantic region of the United States. Although he has been working for only a few years, Paul's job is an important one. He is responsible for managing over 60,000 acres of company timberland that is scattered over a 10-county area. Managing this land encompasses a wide range of duties including budgeting, planning, mapmaking, and overseeing the planting, clearing, harvesting, and selling of the trees. The variety makes Paul's work even more interesting.

Paul didn't just suddenly decide to become a forester. As a youngster, he was active in Scouting and enlarged his interest in and knowledge of the outdoors. Then he attended a college with a forestry curriculum and obtained a bachelor's degree in forestry. While in college, Paul participated in a work-study program 6 months out of each year. In this program, Paul acquired practical experience working as a forestry technician in the National Parks in Montana. Then, during the final summer before his graduation, Paul got a job with a private company. They liked his work and hired him full time when he graduated from college.

There is really no such thing as a typical workday for Paul. His job has variety. In the summer, for example, he may have to direct firefighting activities, while in the winter he may have to check on the company's logging roads to be sure they are passable.

Today, however, is a beautiful March day, and he has neither of these problems. But he does have a full day ahead.

After breakfast, Paul gets in his pickup truck and drives about 30 miles to a section of land being "cruised" by forestry aides. The aides are trying to determine how much marketable wood there is in this particular forest stand. To do this, they have to find out a number of things, including how many trees there are and how much wood each tree contains. Obviously, they cannot count and measure every tree in the stand. Instead, they mark off a typical sample area of the stand and carefully count and measure the trees in the sample area. They also use a tool called an increment borer to determine the age of the trees in the stand. This tool, without harming the tree, can take a pencil-thin sample from the tree's core. To determine the tree's age, the aides simply count the number of rings present from the center to the

Paul has been interested in the outdoors since he was a youngster. "I started thinking about a forestry career when I was working on Scout merit badges," he recalls.

edge of the tree. They can also tell how fast the tree is growing by looking at the distance between the rings.

By the time Paul arrives, the aides have almost finished "cruising" this timber stand. He helps them finish and then carefully records the data they have obtained. When Paul returns to his office, he will enter the data into a computer and onto detailed maps of the tract he has prepared. Then he can determine if the tract is ready to be harvested and, if so, how to harvest the timber in a way that will not harm the environment.

Paul's next stop is at another tract nearby that has just been harvested. Now the site is being prepared for replanting. Paul wants to be sure that the work is going well and according to plan. Much of Paul's work on this tract was completed long ago. Even before the trees were cut, for example, he decided which trees should be left to provide windbreaks and cover for wild game and protection from erosion. These remaining trees are called a leave strip.

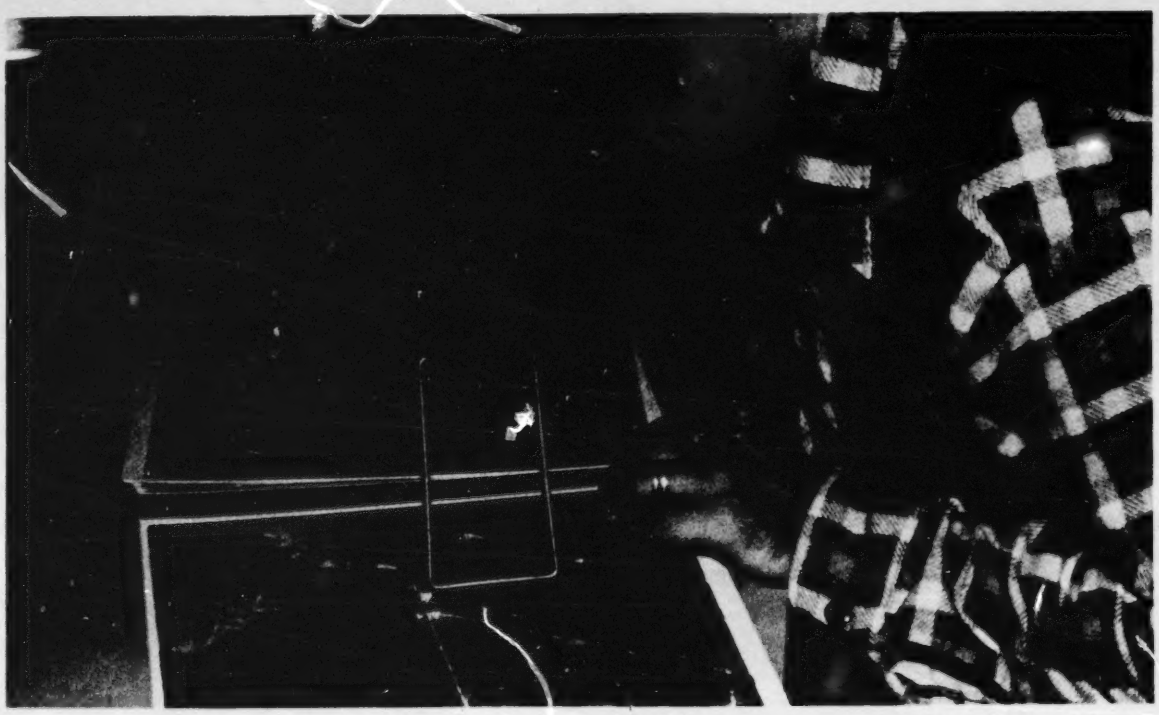
Today, huge bulldozers and other pieces of earthmoving equipment are making windrows on the bare land. This is similar to the contour plowing done by farmers and serves the same purpose. Windrowing helps protect the land from erosion. Paul is pleased with the work and compliments the workers on a job well done. Before leaving, he checks to see if they need any more equipment or supplies.

By now it is almost time for lunch, so Paul drives into a nearby town to buy a sandwich. He eats in the truck while driving to a site about 20 miles away.

This site has already been prepared for planting but is on very uneven land. Because the land is so uneven, it is impossible to use the automatic tree-planting machine that can plant up to 8,000 trees in a day. Instead, the company has hired inexperienced laborers who can at best hand plant only about 1,000 trees per day. Paul wants to check to see that the work is going well and is being done properly.

When he arrives at the site, Paul is not at all happy with what he sees. The laborers have begun planting, but Paul knows many of the trees cannot possibly survive, as they have been improperly planted. Some seedlings, for example, have been planted too deep in the ground, while others don't have enough soil around them. One worker has even planted some seedlings upside down!

Paul doesn't lose his temper, though, as he knows it



Paul can estimate the number of trees in an area by studying an aerial photograph.

would do no good and, in fact, might really alienate the workers. Instead, he patiently and clearly explains how the job should be done. He also talks a little about the business in general and answers any questions the workers have. Paul then works with the men for a couple of hours, planting trees himself and just talking with the workers. Once he is sure the job is going properly, he gets into his pickup truck for the drive back to the office.

The next item on Paul's schedule for today is a short budget meeting at his office. During the meeting, Paul and his supervisory employees discuss how much money can be spent on the various timber operations under his control. This requires some difficult decisions since there is only a certain amount of money available to divide among a number of forestry operations. Should they spend operating money to purchase some new fire-fighting equipment, or would the money be better spent on additional fertilizer for the growing trees?

After the budget meeting, Paul speaks individually with a few of the people around the office before going into his office to do paperwork for about an hour. During this time, he makes notes on some of the items discussed in the budget meeting and also works for a while on the map of the area he helped cruise this morning.

Then Paul decides to call it a day and gets in his pickup to drive home. On the way home, however, he receives a call over his two-way radio about a complaint from Jan Wiley, who owns land nearby. Apparently, the heavy equipment of one of the company loggers is tearing up a road on her land. The farm is nearby, so Paul decides to stop by and speak with Ms. Wiley. After visiting with her and looking at the damage to the road, Paul promises to get the road fixed. This calms Ms. Wiley, and Paul finally goes home.

But his day is not quite over. After supper tonight, Paul is scheduled to speak to a high school science club on forestry and the economic and environmental roles of his company. This is a part of his job that Paul really enjoys. In fact, he has even developed a slide show to help make his talks more interesting and meaningful to the students.

Exploring

Foresters must be well organized and able to set priorities.

- Are you able to plan your time efficiently?
- Do you keep lists of things to do?
- Do you find yourself able both to finish your homework and have time left for recreation?
- Do you keep a diary?
- Do you have trouble deciding between different things to do?
- Do you take part in extracurricular activities at your school?

Foresters must be patient to see the end results of their work.

- Do you enjoy long-term projects, such as gardening?
- Do you ever think about or plan what you will be doing 5 years from now?
- Can you save your money for something you want?

Foresters often must work with other people. There's a lot more to the job than just being out in the woods.

- Do you like to speak in front of your class?
- Do you enjoy working with other people on class projects?
- Do you join organizations and take an active part in them?
- Do you like to help organize activities such as trips, parties, sports events, picnics, and dances?

Foresters must have a genuine love of the outdoors and respect for the environment.

- Do you enjoy outdoor activities such as camping, fishing, hunting, gardening, and hiking?
- Does it bother you when you see a polluted river?
- Do you ever try to think of ways to make the river clean again?
- Do you throw your trash in the trash can?

Suggested Activities

Plan and take part in a science club activity at your school. Activities might include planting trees, pulling weeds, controlling insects, and other outdoor activities.

Volunteer to help with clearing brush, cleaning up a stream, or some other activity that helps our environment.

Try some outdoor hobbies such as hiking, fishing, camping, and birdwatching.

Make a map of your neighborhood or a small park in your area. On the map, show all the trees in the area, their type, and their approximate size. See if you can devise a code for doing this. P 60/20, for example,

might indicate a stand of 60 pine trees, each about 20 feet tall. Using the map you have prepared, see if you can determine what areas could perhaps be thinned and what areas might benefit from a tree planting program.

Get a summer job working on a farm, or find other outdoor summer employment, such as being a camp counselor. Mowing lawns, working in a nursery, and gardening are other good possibilities.

Locate the nearest county, State, or Federal forest in your area. Invite the forester in charge to speak to your class about his or her job. Prepare questions in advance.

If there is a logging or lumber company in your area, call the public relations department and ask if a speaker would be willing to visit your class and explain the company's operations.

Use forestry as a topic for class assignments. Do a report on the lumber industry for a social studies class. Prepare a report on different kinds of wood, their characteristics and uses, for a science class.

Help teach youngsters about the outdoors. You might lead nature walks and help youngsters identify trees, plants, flowers, insects, birds, and other wildlife. Volunteer your services to a day camp, community center, school, or church.

Join a farming organization for young people such as the Future Farmers of America or the 4-H Club. Members of these organizations gain practical experience in agriculture and take part in fairs, agricultural contests, horse shows, and many other activities.

If you are a Boy Scout, try for merit badges in Agriculture, Bird Study, Botany, Camping, Environmental Science, Fish and Wildlife Management, Forestry, Gardening, Insect Life, Nature, Plant Science, Pulp and Paper, Soil and Water Conservation, Surveying, Wildlife Management, and Wilderness Survival.

If you are a Girl Scout, see if your local troop has the From Dreams to Reality program of career exploration. Troops may also offer opportunities to try out careers through internships, service aide and community action projects, and proficiency badges in a number of areas including Animal Kingdom, Campcraft, Conservation, Family Camper, Food Raiser, Games Leader, Hiker, Outdoor Safety, and Plant Kingdom.

Join an Outdoor, Conservation/Ecology, Agriculture, Hunting, Fishing, or Natural Science Explorer Post if there is one in your area. Exploring is open to young men and women aged 14 through 20. To find out about Explorer posts in your area, call "Boy Scouts of America", listed in your phone book, and ask for the "Exploring Division."

For information about careers in forestry, write to the Society of American Foresters, 5400 Grosvenor Lane, Washington, D.C. 20014; American Forest Institute, 1619 Massachusetts Avenue, N.W., Washington, D.C. 20036; U.S. Department of Agriculture, Forest Service, Washington, D.C. 20250.

Related Occupations

Foresters are not the only workers concerned with managing and protecting our natural resources. Using the descriptions below, unscramble the letters to find the names of some of these other workers.

1. STROFERY IDAE. I help foresters care for and manage forest lands and their resources. I may estimate the amount of wood a stand of timber contains, check trees for disease, or assist foresters in other ways.

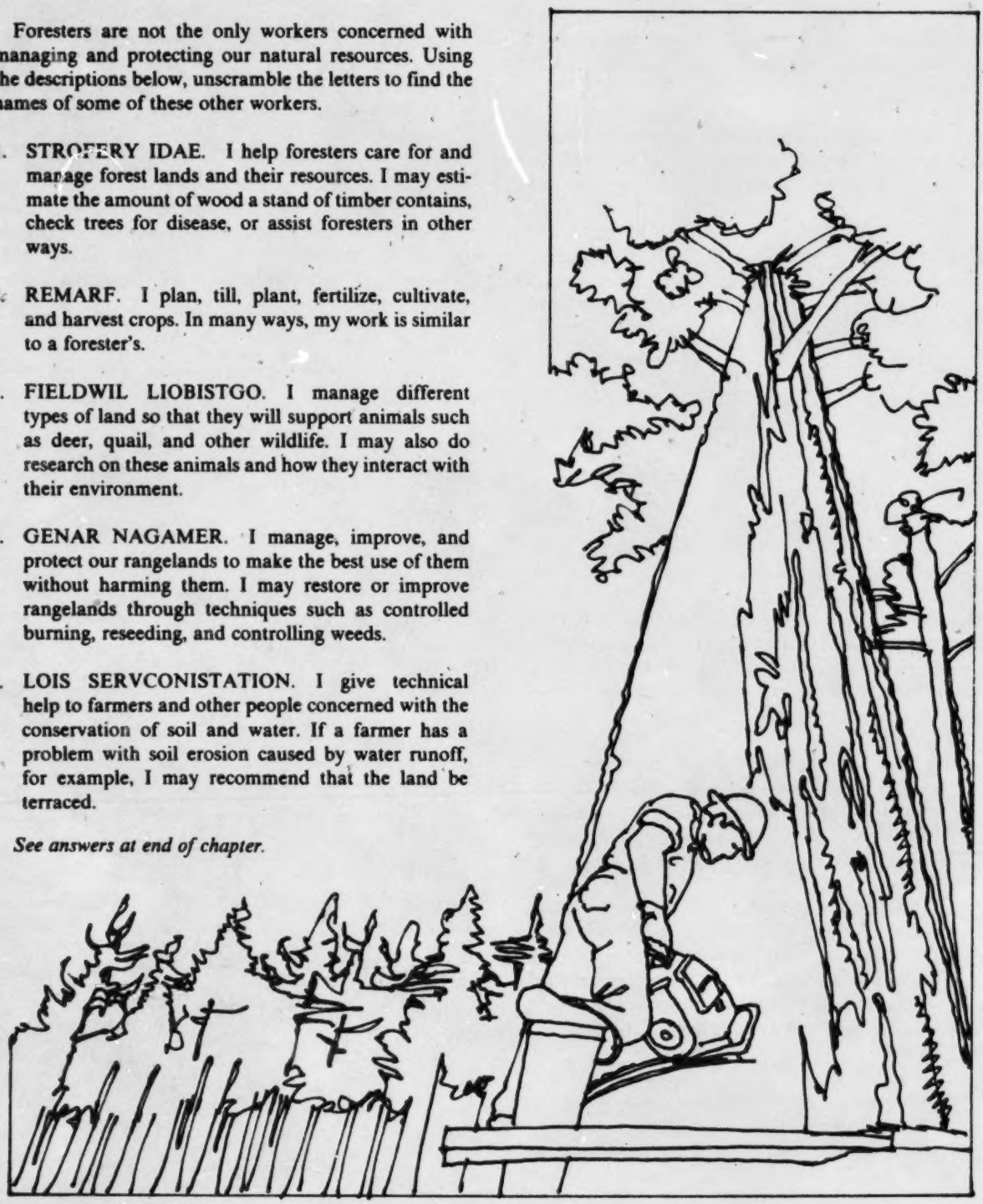
2. REMARF. I plan, till, plant, fertilize, cultivate, and harvest crops. In many ways, my work is similar to a forester's.

3. FIELDWIL LIOBISTGO. I manage different types of land so that they will support animals such as deer, quail, and other wildlife. I may also do research on these animals and how they interact with their environment.

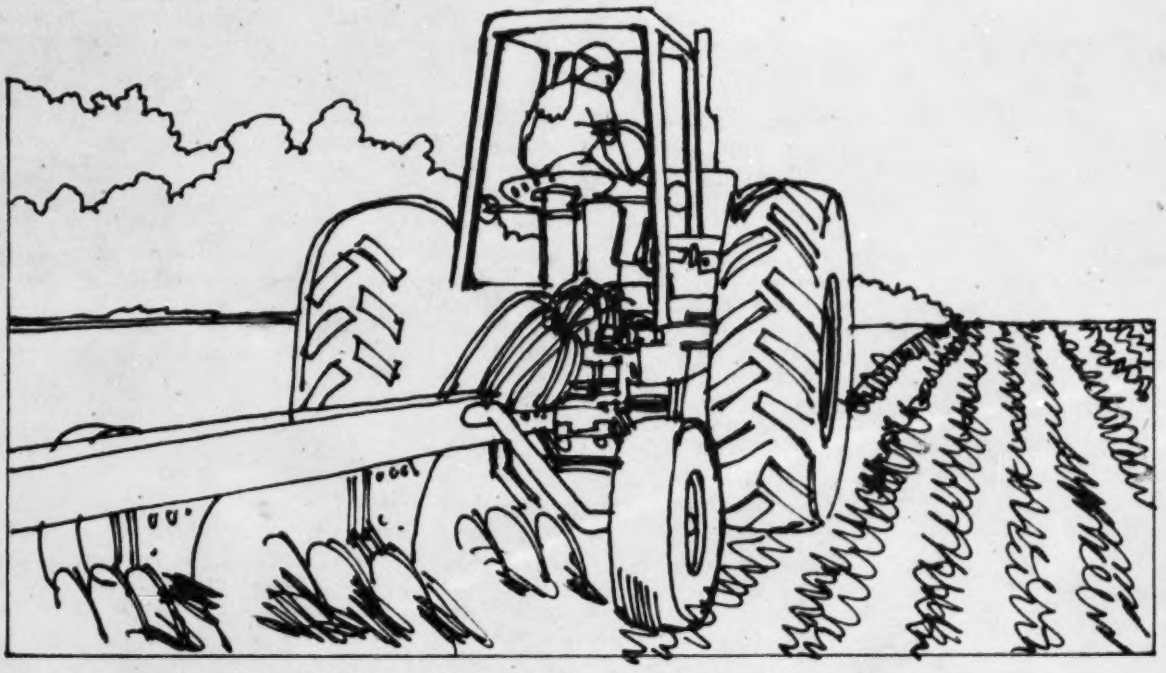
4. GENAR NAGAMER. I manage, improve, and protect our rangelands to make the best use of them without harming them. I may restore or improve rangelands through techniques such as controlled burning, reseeding, and controlling weeds.

5. LOIS SERVCONISTATION. I give technical help to farmers and other people concerned with the conservation of soil and water. If a farmer has a problem with soil erosion caused by water runoff, for example, I may recommend that the land be terraced.

See answers at end of chapter.



Job Facts



There isn't room in this book for a story about every agriculture, forestry, and fishery occupation. However, you'll find some important facts about 18 of these occupations in the following section. You can find additional information about some of them in the Department of Labor's *Occupational Outlook Handbook*, which should be available in your school or public library.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
AGRICULTURAL PRODUCTION OCCUPATIONS			
Farmers	Farmers plan, till, plant, fertilize, cultivate, and harvest crops. Those who raise livestock must feed and care for their animals, and keep barns, pens, milking parlors, and other farm buildings clean. The size of the farm determines how many of these tasks farmers do themselves. On most farms, the farmer does the work with the help of one or two family members or hired hands. Large farms, however, have 100 employees or more.	Experience gained growing up on a farm is very important. A college degree in agriculture is important, too. It is almost essential for people who haven't grown up on a farm. Most colleges of agriculture offer programs in dairy science, crop science, agricultural economics, horticulture, and animal science. Physical stamina and strength are important. Initiative, resourcefulness, and a sense of responsibility are essential. High school courses in mathematics, accounting, shop, and science are helpful, as are courses in vocational agriculture.	Most farmers own or rent the land they farm. Farmers are usually their own bosses. However, land and equipment costs are very high, and many young farmers start out as hired hands or tenant farmers.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Farm Managers	These workers perform much the same duties as farmers. They usually work for others, however, unlike farmers, who are generally self-employed. Farm managers usually work on large farms or for corporations engaged in agribusiness.	A farm background is helpful, and a college degree in agriculture is important. Workers should be good at planning work and supervising people. High school courses in math, accounting, shop, and science are helpful, as are courses in vocational agriculture.	Beginning farmers who cannot afford to purchase their own land, buildings, and equipment may find opportunities in this field.
Farm Laborers	Farm laborers, also known as farm hands, help do all kinds of work. They may, for example, operate farm equipment, feed and care for livestock, and help in harvesting crops. Job duties usually vary according to season and type of farm product. Most laborers are employed on the larger farms.	Farm laborers should be in excellent physical condition. Stamina and strength are important since they must often work long days on their feet or stooped over under the hot sun and may have to carry heavy objects such as bales of hay. High school courses in vocational agriculture are helpful.	A job as a farm laborer is a good way of gaining farm experience. Some of these workers are members of unions.
Farm Labor Supervisors	These workers oversee farm laborers and are responsible for seeing that assigned tasks are done properly and on time. They coordinate work activities, such as planting, cultivating, and harvesting. They schedule the work of crews and may hire additional hands, especially during the harvesting season. They work under the general direction of farmers or farm managers.	A sense of responsibility and the ability to direct and work well with others are essential. A farm background is an asset. High school courses in vocational agriculture are helpful.	Most jobs are on large farms that employ farm laborers.
AGRICULTURAL SUPPORT OCCUPATIONS			
Cooperative Extension Service Workers	These workers conduct educational programs for rural residents. They give farmers technical advice, help farm families learn about home economics and home management, organize activities for youth, and help community leaders plan economic development. Extension workers usually specialize. They may deal primarily with farmers, with community leaders, or with youth.	Extension workers must have at least a bachelor's degree in their subject field. They often receive additional training on the job. They should like working with people and have a genuine desire to help them. A farm background is almost a requirement for agricultural extension workers. High school courses in English, public speaking, science, and math are helpful, as are courses in vocational agriculture.	Most extension service offices are located in small towns. People who are good at teaching and getting ideas across, and who wish to live outside the city, may find extension work the ideal career.

Agriculture, Forestry, and Fishery Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Soil Conservationists	These workers provide technical assistance to farmers, ranchers, and others concerned with the conservation of soil and water. They help develop programs that make the most productive use of the land without damaging it. Most work for the Federal Government. Others work for State and local governments or teach at colleges and universities. Some work for rural banks that make loans for agricultural lands and for lumber and paper companies that have large holdings of forested land.	Only a few colleges and universities offer a degree in soil conservation, and most soil conservationists have college degrees in agronomy. High school courses in math, science, English, and public speaking are helpful. They should be able to get along easily with others and get their ideas across, since their job is one of educating farmers and ranchers about sound conservation practices.	Soil conservationists do most of their work in the field.
Soil Scientists	These workers study the characteristics of soils to help us use our soil resources wisely. Some study the chemical and biological properties of soils to determine their uses in farming. Most, however, prepare maps showing different kinds of soils that are used by builders, land developers, and planners. More than half work for the Soil Conservation Service of the U.S. Department of Agriculture.	A bachelor's degree with a major in soil science or a closely related field, such as agronomy or agriculture, is the minimum requirement.	Soil scientists generally spend much of their time doing field work, which requires travel.
Range Managers	Range managers manage, improve, and protect range resources to maximize their use without causing damage to the environment. They may, for example, determine the number of animals that can be grazed on a given area of range. The majority work for the Federal Government. State game and fish departments also employ range managers, and private industry is hiring increasing numbers. Range managers also work in such closely related fields as wildlife and watershed management, forest management, and recreation.	A bachelor's degree in range management, range science, or a closely related field, such as agronomy or forestry, is the usual minimum educational requirement. Besides having a love for the outdoors, range managers should be able to speak and write effectively and work with others. High school courses in biology, chemistry, physics, and mathematics are helpful.	These workers also are known as range scientists, range ecologists, or range conservationists. Range managers may spend considerable time away from home working outdoors in remote parts of the range.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Agricultural Engineers	These workers are concerned with improving efficiency in agriculture. To do this, they design machinery and equipment and develop new methods used in the production, processing, and distribution of food and other agricultural products. Most work for manufacturers of farm equipment, electric utility companies, and distributors of farm equipment and supplies. Many do farm consulting work independently or for consulting firms. Others work for the U.S. Department of Agriculture, for colleges and universities, and for State and local government agencies.	A bachelor's degree in engineering is required for most beginning jobs. Some engineering jobs are filled by people trained in the appropriate natural science or in mathematics. Graduate study is increasingly important for advancement. Engineers should be able to work as part of a team and should have creativity, an analytical mind, and an ability to deal with details. They should be able to express their ideas well orally and in writing. High school courses in mathematics, physics, chemistry, and English are helpful.	Agricultural engineers may work in research and development, production, sales, or management.
Food Scientists	Most of these workers do research on the chemical, physical, and biological nature of various foods. They then apply this knowledge to come up with new food products, improved processing and packaging techniques, and better ways of storing an adequate, wholesome, and economical food supply. Others work in quality control in laboratories or in production areas of food processing plants. Food scientists work in all sectors of the food industry and in every State. Some do research for Federal agencies, such as the Food and Drug Administration. A few work for private consulting firms or agencies, such as the United Nations. Others teach or do research in colleges and universities.	A bachelor's degree in food science, biology, or chemistry is the minimum requirement for beginning positions. Many jobs, especially teaching and research, require a graduate degree. Food scientists with a bachelor's degree might start work as quality assurance chemists or as assistant production managers. After gaining experience, they can advance to more responsible management jobs. A food scientist might also begin as a junior food chemist in a research and development laboratory of a food company and be promoted to section head or another research management position. People who have master's degrees may begin as senior food chemists in a research and development laboratory. Those who have doctor's degrees usually begin their careers doing basic research or teaching. High school courses in biology, chemistry, physics, mathematics, home economics, and English are helpful.	Food scientists work with different products, depending upon the part of the country where they are employed. In Maine and Idaho, for example, they work with potato processing; in the Midwest, with cereal products and meat-packing; and in Florida and California, with citrus fruits and vegetables.

Agriculture, Forestry, and Fishery Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Farm Equipment Mechanics	These workers maintain and repair the wide variety of agricultural equipment used in modern agriculture. Most work in service departments of farm equipment dealers. Others work in independent repair shops, in shops on large farms, and for wholesalers and manufacturers.	Most are hired as helpers and learn the trade on the job. Employers prefer applicants who have an aptitude for mechanical work. A farm background is an advantage. High school or vocational school courses in repairing diesel or gasoline engines, blueprint reading, the maintenance and repair of hydraulics, and welding are helpful, as are basic math and science courses.	Mechanics often have to travel miles to repair equipment in the field, especially during busy harvest and planting times.
Buyers and Shippers, Farm Products	These workers perform a variety of duties, depending on the type of commodity they deal in. Most buy commodities from producers and then sell and ship them to retail or wholesale outlets. Many buyers work for themselves. Others work for supermarket chains and other large purchasers of farm products.	A farm background is helpful since buyers are responsible for the quality of the products they deal in. They also should possess many of the traits of successful sales workers, such as aggressiveness and the ability to deal with people. Some States require that buyers be licensed.	The job provides numerous opportunities for travel, working outdoors, and dealing with other people.
Veterinarians	Veterinarians deal with diseases and injuries among animals. They perform surgery and prescribe and administer drugs, medicines, and vaccines. Some inspect foods as part of public health programs, teach, or do research. Most veterinarians are in private practice. The type of practice varies according to the geographic setting. Veterinarians in rural areas mainly treat farm animals; those in small towns usually engage in general practice; those in cities and suburban areas often limit their practice to pets. Some work for government health agencies, colleges of veterinary medicine, research laboratories, large livestock farms, animal food companies, and pharmaceutical firms.	It takes many years of schooling to become a veterinarian. To qualify for the required license, candidates usually must complete at least 2 years of college (although most complete more) and 4 years in a college of veterinary medicine and pass a State Board examination. Positions in research and teaching often require an additional master's or Ph. D. degree. Some States issue licenses to veterinarians already licensed by another State without further examination. High school students interested in becoming veterinarians should take as many science courses as possible.	Most veterinarians begin as employees or partners in established practices. The job may involve long and irregular hours, traveling and outdoor work, and danger of injury, disease, or infection.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
FORESTRY OCCUPATIONS			
Foresters	Foresters manage, develop, and protect forest resources, including timber, water, wildlife, forage, and recreational areas. They plan and supervise the cutting and planting of trees and have other duties ranging from wildlife protection and watershed management to the development and supervision of camps, parks, and grazing lands. Not quite half work in private industry. About one-fourth work for the Federal Government, primarily in the Forest Service. The remainder work for State and local governments, colleges and universities, or consulting firms.	A bachelor's degree with a major in forestry is the minimum requirement. Advanced degrees, however, are becoming increasingly important. Foresters must enjoy working outdoors, be able to work well with people, express themselves clearly, and be willing to move to remote places. High school courses in English, public speaking, math, and science are helpful.	Foresters often specialize in one area of work, such as timber management, outdoor recreation, or forest economics.
Forestry Technicians	These workers help foresters care for and manage forest lands and their resources. They may help estimate timber production for a certain area; inspect trees for disease and other problems; help prevent and control fires; and maintain forest areas for hunting, camping, and other activities. About half work in private industry, mainly for logging, lumber, and paper companies. Federal and State governments employ the rest, with the Forest Service employing the majority.	Enthusiasm for outdoor work, physical stamina, and the ability to work without direct supervision are essential. Formal training after high school is becoming increasingly important, although some people get jobs based on work experience on firefighting crews, in tree nurseries, or in park and recreation work. One and two-year programs in forestry technology are offered by technical institutes, community and junior colleges, and universities. High school courses in English, math, and science are helpful.	Opportunities for summer and part-time work are good. Working summers provides experience that can later help in getting a job. Forestry technicians spend considerable time outdoors in all kinds of weather, sometimes in remote areas. They work many extra hours in emergencies, such as fighting fires and controlling floods.
Loggers	These workers harvest trees. Their specific job titles usually indicate the part of the harvesting process with which they are involved. *Fallers*, for example, use power saws to cut down large trees. As soon as the tree is down, *buckers* saw the limbs off and cut the trunks into logs. *Choker setters* then attach steel cables (chokers) to the logs which are then skidded out of the woods by *logging-tractor operators*. A *rigging slinger* supervises and assists choker setters and tractor drivers.	Most loggers get their first jobs without previous training. Entry level jobs usually can be learned in a few weeks by observing and helping experienced workers. Because the jobs involve some heavy labor, loggers should be in good physical condition and have stamina and agility. Because of the dangers involved in the work, loggers should be alert and well coordinated. Loggers usually start by helping choker setters or buckers. As they become more experienced, they may advance to more highly skilled jobs as vacancies occur.	Loggers often must do their jobs under unpleasant working conditions. Most jobs are outdoors and the weather can be very hot and humid or extremely cold. The forest may be very wet and muddy, with many annoying insects during the summer. Sometimes, working time and pay may be lost because of bad weather. Also, the work is more hazardous than most jobs. For many persons, however, the opportunity to work and live in forest regions, away from crowded cities, more than offsets these disadvantages. Many loggers are members of unions.

Agriculture, Forestry, and Fishery Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
FISHERY OCCUPATIONS			
Fishers	These workers harvest fish, shellfish, and other aquatic animal life using a variety of methods. Usually, the methods depend on where they are fishing and the type of fish they are trying to catch. Tuna fishers on the West Coast, for example, may use huge nets that encircle an entire school of tuna fish, while lobster fishers in Maine use wooden traps to catch their quarry.	Commercial fishing is not easy work. Fishers should be willing to work long hours and should be in good physical condition. Good eyesight is also essential for fishers involved with operating fishing vessels. High school courses in mathematics, chemistry, and physics are helpful.	Many fishers must spend considerable time at sea. Earnings fluctuate greatly in this field, since they often depend on the number and type of fish caught.
Fish Farmers	These workers, also called fish culturists, raise fish for stocking streams and for the live-bait industry. They also raise fish for food. They work mainly in fish hatcheries and are responsible for providing a suitable environment for the type of fish being raised. To do this, they adjust the volume, depth, velocity, and temperature of the water. They also plan feeding programs and check fish for signs of disease. They also may make arrangements with buyers for the sale of the fish they raise.	These workers usually need a minimum of 4 years in college leading to the bachelor's degree in an aquatic biology curriculum. Experience gained working part time or summers in a fish hatchery is also useful. High school courses in physics, chemistry, biology, English, communications, and mathematics are helpful.	Aquaculture is an area offering increasing opportunities for employment with private enterprises.

Answers to Related Occupations

FARMER

1. Farm manager, 2. Farm equipment mechanic, 3. Farm laborer, 4. Agricultural pilot, 5. Agricultural products broker, 6. Veterinarian.

COOPERATIVE EXTENSION SERVICE WORKER

1. a, 2. b, 3. a, 4. c, 5. b.

FORESTER

1. Forestry aide, 2. Farmer, 3. Wildlife biologist, 4. Range manager, 5. Soil conservationist.

Answers to math problems

FARMER

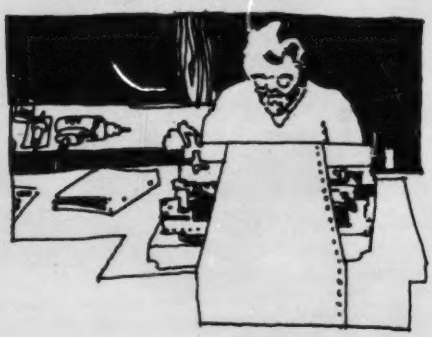
1. 24,000 bushels, 2. a. $2.50 per bushel, b. $3.50 per bushel, 3. $2,240, 4. $1.20 profit for each bushel fed.

Occupational Outlook Handbook

One of the most widely used resources in the field of vocational guidance, the Handbook is an "encyclopedia of careers" covering several hundred occupations. A new edition is published every 2 years. The reader will find information on

- What the work is like
- Job prospects
- Personal qualifications
- Education and training requirements
- Earnings
- Related occupations
- Where to find additional information.

Contact any of the BLS Regional Offices listed inside the back cover for price and ordering information.



Occupational Outlook Quarterly

A periodical to help students, job seekers, counselors, and education planners keep up with occupational and employment developments. The Quarterly is written in nontechnical language and illustrated in color. Articles cover such topics as these:

- Job prospects for college graduates
- How to look for a job
- Matching personal and job characteristics

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Subscription price per year (4 issues) is $6 domestic, $7.50 foreign, single copy $1.75. Prices are subject to change.

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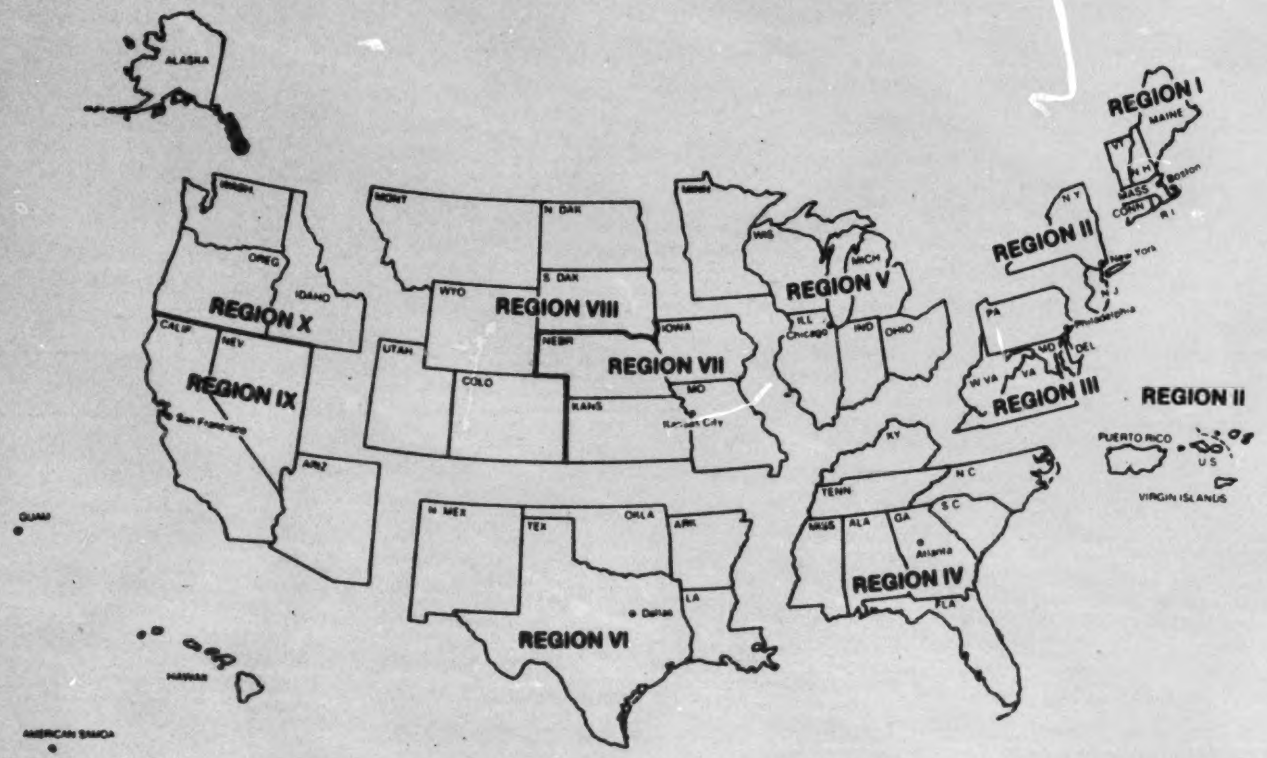
Bureau of Labor Statistics
Regional Offices



Region I
1603 JFK Federal Building
Government Center
Boston, Mass. 02203
Phone: (617) 223-6761

Region II
Suite 3400
1515 Broadway
New York, N.Y. 10036
Phone: (212) 944-3121

Region III
3535 Market Street
P.O. Box 13309
Philadelphia, Pa. 19101
Phone: (215) 596-1154

Region IV
1371 Peachtree Street, N.E.
Atlanta, Ga. 30309
Phone: (404) 881-4418

Region V
9th Floor
Federal Office Building
230 S. Dearborn Street
Chicago, Ill. 60604
Phone: (312) 353-1880

Region VI
Second Floor
555 Griffin Square Building
Dallas, Tex. 75202
Phone: (214) 767-6971

Regions VII and VIII
911 Walnut Street
Kansas City, Mo. 64106
Phone: (816) 374-2481

Regions IX and X
450 Golden Gate Avenue
Box 36017
San Francisco, Calif. 94102
Phone: (415) 556-4678